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FDZ network commands

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SS2017 - Network commands

Abstract

This document describes the network commands used by the FDZ.

Inhaltsverzeichnis

1 JSAP

1.1 Commands between Java-SAP interface (JS) and CentralControl (ST)

1.1.1 Common errors

- `STJSF000<Message-ID>0000`
  Command not understood.

1.1.2 Start a product-pallet fill order

- `JSSTK000<Message-ID>0063{rgybw-}*63`
  Start a fill order with the requested pattern (string with 63 characters).
- `STJSA001<Message-ID>0000`
  Confirm the command (ACK001).
- `STJSA002<Message-ID>0000`
  Requested pattern can be produced.
- `STJSA003<Message-ID>0018rxxgxxyxxbxxwxxttt`
  The order was completed successfully. The amount of used smarties for every color (xx) and the needed time in seconds (001 - 999, if more time was needed 0) is returned.

Possible errors:

- `STJSF001<Message-ID>0015rxxgxxyxxbxxwxx`
  Error while production. The amount of smarties already used is returned.
- `STJSF002<Message-ID>0000`
  Not enougth smarties for the order.
- `STJSF003<Message-ID>0000`
  Error: Request while production.

1.1.3 Request the stock

- `JSSTK001<Message-ID>0000`
  Request the actual stock.
- `STJSA001<Message-ID>0000`
  Confirm the command (ACK001).
- `STJSA005<Message-ID>0020rxxxgxxxyxxxbxxxwxxx`
  Command executed successfully. The amount of smarties available of every color is returned.

Possible errors:

- `STJSF003<Message-ID>0000`
  Error: Request while production.

1.1.4 Cancel order

- `JSSTK002<Message-ID>0000`
  Cancel the actual order.
- `STJSA001<Message-ID>0000`
  Confirm the command (ACK001).
- `STJSA004<Message-ID>0000`
  The order was cancelled by JSAP.

Possible errors:

- `STJSF004<Message-ID>0000`
  No order that can be cancelled (= no active order).
- `STJSF005<Message-ID>0000`
  The active order is not the order to be cancelled.

1.2 Commands between GUI (GU) and JSAP (JS)

1.2.1 New order

- `GUJSK000<Message-ID>0072{rgbybw-}*63<User-ID>`
  Add new production order to the system. The requested pattern is given as string with 63 characters. The user-id is given as integer with 9 digits.
- `JSGUA001<Message-ID>0009xxxxxxxxx`
  Order received successfully. The order-id (xxxxxxxxx) is returned.

1.2.2 Request status of an order

- `GUJSK001<Message-ID>0009xxxxxxxxx`
  Request the status of the order with order-id xxxxxxxxx.
- `JSGUA001<Message-ID>0006tttttt`
  The estimated time the order will take to complete in seconds (tttttt) from now is returned.

2 Robot

2.1 Commands between CentralControl (ST) and RobotControl(Sr)

2.1.1 Common errors

Common errors among all commands:

- `SrSTF000<Message-ID>0000`
  Command not understood.
- `SrSTF001<Message-ID>0000`
  Command not executed.
- `SrSTF002<Message-ID>0000`
  No stock-pallet at place A or B.
- `SrSTF003<Message-ID>0000`
  No product-pallet at place X.
- `SrSTF004<Message-ID>0000`
  Place A or B is occupied.
- `SrSTF005<Message-ID>0000`
  Place X is occupied.
- `SrSTF999<Message-ID>0000`
  Critical error.

2.1.2 Take pallet from transport belt

- `STSrK000<Message-ID>0091{rgybw-}*91`
  Take stock-pallet from transport belt to a free workspace (place A or B). The stock of that pallet is the string with 91 characters. OR:
- `STSrK001<Message-ID>0000`
  Take product-pallet from transport belt to workspace X.
- `SrSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SrSTA002<Message-ID>0000`
  Command executed successfully (ACK002).

2.1.3 Fill product-pallet

- `STSrK002<Message-ID>0063{rgybw-}*63`
  The command to fill the product-pallet with smarties. The pattern is given as string with 63 characters (The product-pallet has only 63 places).
- `SrSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SrSTA002<Message-ID>0063{rgybw-X}*63`
  Command executed successfully (ACK002). The filled pattern is returned (X = place that could not be filled (missing smarties)).

Possible errors:

- `SrSTF006<Message-ID>0063{rgybw-}*63`
  Requested position on product-pallet is occupied. The actual stock of the product-pallet is returned.

2.1.4 Move Pallet to transport belt

- `STSrK003<Message-ID>0000`
  Move stock-pallet to transport belt. OR:
- `STSrK004<Message-ID>0000`
  Move product-pallet to transport belt.
- `SrSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- K003: `SrSTA002<Message-ID>0091{rgybw-}*91`
  Command executed successfully (ACK002). The Stock of the moved pallet is returned. OR:
- K004: `SrSTA002<Message-ID>0000`
  Command executed successfully (ACK002).

2.1.5 Swap storage-pallets

- `STSrK005<Message-ID>0091{rgybw-}*91`
  Take a stock-pallet from the transport belt to a free place (A or B) and move the pallet on the other place back to the transport belt.
- `SrSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SrSTA002<Message-ID>0091{rgybw-}*91`
  Command completed successfully (ACK002). The stock of the pallet that was moved to the transport belt is returned.

2.1.6 Resort stock-pallet

- `STSrK007<Message-ID>0000`
  Resort the smarties on pallet A or B (if only one pallet is there) or resort smarties from the emptier pallet to the other.
- `SrSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SrSTA002<Message-ID>0000`
  Command completed successfully (ACK002).

2.1.7 Shut down control

- `STSrK006<Message-ID>0000`
  Shut down robot and RobotControl.
- `SrSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SrSTA002<Message-ID>0000`
  Command completed successfully (ACK002).

2.2 Commands between RobotControl (Sr) and Robot (ro)

2.2.1 Common errors

- `roSrF000<Message-ID>0000`
  Command not understood.
- `roSrF001<Message-ID>0000`
  Command not executed.

2.2.2 Move pallet from transport belt to place ABX

- `SrroK000<Message-ID>0001{ABX}`
  Move a pallet from the transport belt to the specified place (A, B or X).
- `roSrA001<Message-ID>0000`
  Confirm the command (ACK001).
- `roSrA002<Message-ID>0000`
  Command executed successfully (ACK002).

2.2.3 Move pallet from place ABX to transport belt

- `SrroK001<Message-ID>0001{ABX}`
  Move a pallet from specified place (A, B or X) to the transport belt.
- `roSrA001<Message-ID>0000`
  Confirm the command (ACK001).
- `roSrA002<Message-ID>0000`
  Command executed successfully (ACK002).

2.2.4 Move smarite form pallet and index to pallet and index

- `SrroK002<Message-ID>0006{ABX}xx{ABX}yy`
  Move a smartie from pallet at place ABX at index xx to the pallet at place ABX and index yy.
- `roSrA001<Message-ID>0000`
  Confirm the command (ACK001).
- `roSrA002<Message-ID>0000`
  Command executed successfully (ACK002).

2.2.5 Shut down robot

- `SrroK003<Message-ID>0000`
  Move the robot to its start position and shut down.
- `roSrA001<Message-ID>0000`
  Confirm the command (ACK001).
- `roSrA002<Message-ID>0000`
  Command executed successfully (ACK002). This is definded but not used!

3 Stock

3.1 Commands between CentralControl (ST) and StockControl (SI)

3.1.1 Common errors

Common errors among all commands:

- `SlSTF000<Message-ID>0000`
  Command not understood.
- `SrSTF999<Message-ID>0000`
  Critical error / Recovery cancelled.

3.1.2 Remove pallet

- `STSlK005<Message-ID>0004{rgybw}xxx`
  Remove a pallet with xxx smarties (valid range: 001 - 999) of the requested color (r = red, g = green, y = yellow, b = blue, w = brown). OR:
- `STSlK007<Message-ID>0020rxxxgxxxyxxxbxxxwxxx`
  Remove a pallet with an amount for every available color (range: 000 - 999).
- `SlSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SlSTA002<Message-ID>0094xxx{rgybw-}*91`
  Command executed successfully (ACK002). This includes the content of the removed pallet as string with 91 characters (r, g, y, b, w, -) and the id of this pallet (xxx).

Possible errors:

- `SlSTF003<Message-ID>0000`
  Invalid color requested.
- `SlSTF004<Message-ID>0000`
  Invalid amount requested.
- `SlSTF010<Message-ID>0000`
  Not enougth smarties in the storage (counted over all pallets).
- `SlSTF011<Message-ID>0000`
  Mechanical error.

3.1.3 Store pallet

- `STSlK004<Message-ID>0094xxx{rgybw-}*91`
  Store the pallet with id xxx and the content defined as string with 91 characters.
- `SlSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SlSTA002<Message-ID>0000`
  Command executed successfully (ACK002).

Possible errors:

- `SlSTF006<Message-ID>0000`
  No free place in storage.
- `SlSTF007<Message-ID>0000`
  Pallet is empty.
- `SlSTF009<Message-ID>0000`
  Pallet-id already stored.
- `SlSTF008<Message-ID>0000`
  Mechanical error.

3.1.4 Request amount of empty places in storage

- `STSlK003<Message-ID>0000`
  Request the amount of empty places in storage.
- `STSlA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SlSTA002<Message-ID>0003xxx`
  Command executed successfully (ACK002). The amount will be sent as xxx.

3.1.5 Request amount of stored smarties of a color

- `STSlK001<Message-ID>0001{rgybw}`
  Request the amount of stored smarties of color r,g,y,b or w.
- `STSlA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SlSTA002<Message-ID>0004xxxx`
  Command executed successfully (ACK002). The amount will be sent as xxx.

Possible errors:

- `SlSTF003<Message-ID>0000`
  Requested undefined color.

3.2 Request the availability of a color

- `STSlK002<Message-ID>0004{rgybw}xxx`
  Reqest, if the amount xxx of color (rgbyw) is availavle in the storage.
- `STSlA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SlSTA002<Message-ID>0000`
  Command executed successfully (ACK002). Requested amount is available.

Possible errors:

- `SlSTF003<Message-ID>0000`
  Requested undefined color.
- `SlSTF004<Message-ID>0000`
  Requested invalid amount.
- `SlSTF002<Message-ID>0003xxx`
  The requested amount is not available. The available amount will be sent as xxx.

3.2.1 Shut down system

- `STSlK006<Message-ID>0000`
  Shut down the system.
- `SlSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SlSTA002<Message-ID>0000`
  Command executed successfully (ACK002). This is defined but not used in the system!

3.3 Commands between StockControl (Sl) and Storage (la)

3.3.1 Common errors

- `laSlF000<Message-ID>0000`
  Command not understood.

3.3.2 Remove pallet

- `SllaK002<Message-ID>0003xxx`
  Remove pallet from place xxx.
- `laSlA001<Message-ID>0000`
  Confirm the command (ACK001).
- `laSlA002<Message-ID>0000`
  Command executed successfully (ACK002).

Possible errors:

- `laSlF000<Message-ID>0000`
  Invalid place-id.
- `laSlF002<Message-ID>0000`
  Mechanical error.

3.3.3 Store pallet

- `SllaK001<Message-ID>0003xxx`
  Send command to storage: Store the pallet at place xxx.
- `laSlA001<Message-ID>0000`
  Confirm the command (ACK001).
- `laSlA002<Message-ID>0000`
  Command executed successfully (ACK002).

Possible errors:

- `laSlF000<Message-ID>0000`
  Invalid place-id.
- `laSlF001<Message-ID>0000`
  Mechanical error.

4 Transport

4.1 Commands between CentralControl (ST) and TransportControl (St)

4.1.1 Common errors

- `StSTF000<Message-ID>0000`
  Command not understood.
- `StSTF001<Message-ID>0000`
  Command not executed.
- `StSTF002<Message-ID>0002xx`
  The carriage with id xx did not reach the destination.
- `StSTF003<Message-ID>0003xxx`
  Hardware error: The error is specified in the id xxx (000: SPS not working, 001: No pressure, 002: Fuse error, 003/4/5: Drive transport belt 1/2/3 not working, 006: Emergency-stop pressed).
- `StSTF999<Message-ID>0000`
  Critical error.

4.1.2 Request empty carriage

- `STStK001<Message-ID>0002xx`
  Reqest a empty carriage to position xx (ro = Robot, la = Stock, ea = IO-Station).
- `StSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `StSTA002<Message-ID>0002xx`
  Command completed successfully (ACK002). The new id (xx) of the carriage is returned.

4.1.3 Release carriage

- `STStK002<Message-ID>0002xx`
  Release carriage with id xx (00 - 99).
- `StSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `StSTA002<Message-ID>0000`
  Command completed successfully (ACK002).

4.1.4 Reposition carriage

- `STStK003<Message-ID>0004xxyy`
  Reposition the carriage with id xx (0 - 99) to position yy (ro, la, ea).
- `StSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `StSTA002<Message-ID>0000`
  Command completed successfully (ACK002).

4.1.5 Shut down transport system

- `STStK004<Message-ID>0000`
  Shut down the system.
- `StSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `StSTA002<Message-ID>0000`
  Command completed successfully (ACK002).

4.2 Commands betwen TransportControl (St) and transport belt (tr)

This part uses it own network protocol. It is binary and does not send ASCII-strings. Message-structure:

- 1 Byte command-id
- 2 Bytes payload length
- 0 - x Bytes payload
- Bytes filled up with zeros until the packet size reaches 12 bytes (tr to St) or 8 bytes (St to tr).

4.2.1 Set switch

- `1 2 xy`
  Set the switch with id x (1 Byte) to position y (1 Byte; 0 = to main transport belt, 1 = to side transport belt).
- `130 0`
  Command executed successfully.

4.2.2 Set loadstation

- `2 2 xy`
  Set the loadstation with id x (1 = Stock, 2 = Robot, 3 = IO) to status y (0 = not locked, 1 = locked).
- `130 0`
  Command executed successfully.

4.2.3 Set stopper

- `4 2 xy`
  Set the stopper with id x to position y (0 = down, 1 = up).
- `130 0`
  Command executed successfully.

4.2.4 Request RFID

- `5 1 x`
  Read the content with the RFID-reader with id x (1 = Stock, 2 = Robot, 3 = IO, 4 = Before top switch).
- `131 1 x`
  Command executed successfully. The content of the RFID tag (or 0) is returned.

4.2.5 Set RFID

- `7 2 xy`
  Write data y with RFID-reader x.
- `130 0`
  Command executed successfully.

4.2.6 Request sensors

- `6 0`
  Request the state of all sensors.
- `128 5 xxxxx`
  Command executed successfully. The state of the sensors is returned.
  The 5 Bytes representing the states of the following sensors (Top = IO, Bottom = Robot):

	Bit							
Byte	0	1	2	3	4	5	6	7
0 (top left)	B3.3	B9	B9.1	B14	B14.1	B7	B5.1	
1 (bottom left)	B2.3	B10	B10.1	B6	B6.1	B8	B8.1	
2 (Top)	B19	B16.1	B16	B18.1	B18	B11.2	B4.1	B4
3 (Middle left)	B3.5	B3	B2.1	B2.2				
4 (Bottom)	B2.4	B2	B1.4	B1.1	B1	B15.1	B15	B17

4.2.7 Shut down

- `127 0`
  Shut down.
- `130 0`
  Command executed successfully.

5 IO-Station (EA)

5.1 Commands between CentralControl (ST) and IOStation-Control (Se)

5.1.1 Common errors

- `SeSTF000<Message-ID>0000`
  Command not understood.
- `SeSTF001<Message-ID>0000`
  Command not executed.
- `SeSTF999<Message-ID>0000`
  Critical error

5.1.2 Remove empty stock-pallet

- `STSeK000<Message-ID>0003xxx`
  Remove the pallet with id xxx from the transport belt.
- `SeSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SeSTA002<Message-ID>0000`
  Command executed successfully (ACK002).

5.1.3 Remove product-pallet

- `STSeK001<Message-ID>0063{rgybw-}*63`
  Remove the product-pallet with the specified stock from the transport belt.
- `SeSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SeSTA002<Message-ID>0000`
  Command executed successfully (ACK002).

5.1.4 Fill stock-pallet

- `STSeK002<Message-ID>0091{rgybw-}*91`
  Fill a empty stock-pallet with the specified pattern.
- `SeSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SeSTA002<Message-ID>0094xxx{rgybw-}*91`
  Command executed successfully (ACK002). The id and the stock of the pallet is returned.

5.1.5 Add stock-pallet

- `STSeK003<Message-ID>0003xxx`
  Add the previously filled stock-pallet with id xxx on the transport belt.
- `SeSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SeSTA002<Message-ID>0094xxx{rgybw-}*91`
  Command executed successfully (ACK002). The id and the stock of the pallet is returned.

5.1.6 Add empty product-pallet

- `STSeK004<Message-ID>0000`
  Add an empty product-pallet on the transport belt.
- `SeSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SeSTA002<Message-ID>0000`
  Command executed successfully (ACK002).

5.1.7 Shut down system

- `STSeK005<Message-ID>0000`
  Shut down the system.
- `SeSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SeSTA002<Message-ID>0000`
  Command executed successfully (ACK002).

5.1.8 Remove non-empty stock-pallet

- `STSeK006<Message-ID>0094xxx{rgybw-}*91`
  Remove the storeage-pallet with id xxx and the specified stock from the transport belt.
- `SeSTA001<Message-ID>0000`
  Confirm the command (ACK001).
- `SeSTA002<Message-ID>0000`
  Command executed successfully (ACK002).